Circular economy as local development strategy

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1. Introduction

A number of cities and municipalities market themselves these years as "circular cities". Municipalities can and should play a central role in developing a more circular economy and can have a variety of roles, which are discussed in this working paper:

I. Facilitator between different actors in the municipality

II. Developer of local knowledge infrastructure that supports local actors' work on integrating environmental, social and socio-economic considerations into their strategies and companies' business models

III. Green public procurement that contributes to market development for green solutions through strategic market dialogue and through the specific purchases

IV. Policy developer through the establishment of rules, tax structures, etc., which encourage changed practices in businesses, residential areas, etc.

V. Innovation, investment and operation of infrastructure facilities

Unfortunately, it does not seem that any cities or municipalities so far have systematically worked with all these roles in relation to circular economy.

2. Three European examples

At AAU, we have analyzed circular economy strategies and activities in three major European cities: Amsterdam, Paris and London.

One of the first cities to develop a circular economy strategy was Amsterdam. The city has a rather technical approach to the circular economy with the greatest focus on the closure of resource flows of organic waste etc. and e.g. not for slowing resource flows through longer product lifetimes. The most innovative is probably that Amsterdam will establish a local food production and local recycling of phosphorus. Circular economy is linked to the city's "smart city" strategy and to some extent to the city's strategy of becoming a "sharing city", where focus is on sharing activities.

Paris has a more social profile for its work on circular economy with a focus on creating social cohesion in the Paris region. Key words from the Parisian strategy include: Fab Labs and office communities, changed waste taxes and forced donation of surplus food from shops for social purposes. For products, focus is on repair, reuse, recycling and re-manufacture. Some of the same activities are seen within the product area in London's circular economy strategy, where the focus is largely on service sector development. London also sees the city's ability to support start-ups and the city's young entrepreneurial environment as a local resource.

It is exciting that both Amsterdam and Paris have implemented multi-tasking-based planning processes with wide involvement of local actors - something that could be exciting to see in Danish cities and municipalities.

3. Knowledge and time as scarce resources in companies

A local strategy for circular economy should include a focus on the knowledge and time barriers that may cause a company to develop ideas for its contribution to a more circular economy as part of its business model. Our research at AAU has pointed to a number of challenges where companies may need external collaboration:

A. Companies often lack knowledge about how to investigate users' application of the company's products and services and how to inform users about correct use, which among other things can ensure a longer product life. AAU has developed methods and tools that can support companies in these processes, among other things, based on concepts from user participation in innovation.

B. Companies often do not apply systematic knowledge from service, maintenance and repair to designing products and services. AAU works with methods to increase companies' so-called "environmental design capability".

C. Companies often lack the time and the knowledge to find out how to set environmental requirements to their suppliers, and how they as a customer in a value chain can support their suppliers' environment-oriented change processes through requirements, competence building and long-term cooperation agreements.

D. Small amounts of waste from the individual company can make economically attractive agreements with waste management companies more difficult for the company. Therefore, cooperation between local companies with the same type of waste can imply that economically and environmentally better waste recycling schemes can be established. Local waste management should be combined with the establishment of a so-called cleaner technology review scheme with analysis of opportunities to minimize a company's waste on air, water and soil. Such reviews were offered to companies in several municipalities and counties in the 1990s and are still an important method to be used before establishing local waste recycling by industrial symbiosis or the like.

4. Development of local physical and knowledge infrastructure

As circular economy is not a legal requirement for companies, it is necessary to encourage and support companies in working with circular economy within slowing, narrowing and closing resource flows. This can be done by developing the physical and knowledge infrastructure in a municipality - financed through for example property taxes, waste taxes and membership fees to business areas' estate owner associations.

The *physical* infrastructure can consist of shared facilities for repairing products, receiving and collecting waste and maybe processing and recycling of waste, but also facilities in terms of living labs etc. for the development and testing of new concepts, forms of cooperation, etc.

The *knowledge* infrastructure can consist of a secretariat or a centre that can support companies in their acquisition of knowledge, facilitating dialogue with customers and suppliers, etc. A centre can also organize courses and workshops with competence building and exchange of experiences between local companies, etc. A centre can also develop opportunities for innovation collaboration between local or regional companies, housing associations, authorities, researchers and students from research and education institutions, environmental organizations, estate owners' associations, etc.

Such a centre can also try to attract new businesses that meet new needs arising as part of developing a more circular economy. It could be service and repair companies targeting local companies' products or equipment, which could lead to prolonged product life. It could also include more efficient use of equipment through sharing economy schemes.

The organizational model for this kind of local infrastructure for circular economy can draw inspiration from various existing innovation and environmental networks such as Frederikssund Business (http://www.frederikssunderhvervsportal.dk/), the early Innovationshuset in the City of Copenhagen, Green Network in Vejle (http://greennetwork.dk/) and the cross-municipal Network for Sustainable Business Development in North Jutland (https://nben.dk).

5. Local value creation and high quality participation

The recent years' controversies in connection with planning of wind turbines, biogas plants, recycling sites etc. in various parts of Denmark point to the importance of ensuring during planning that the development of local facilities and infrastructures contribute to local value creation. The same perspective is important when developing a local strategy for circular economy, cf. the experiences from Amsterdam and Paris. Local value creation requires the development of local ownership and contribution to the development of local economic, social and employment resources. However, such an approach requires an early, broad and high quality participation of various local actors where they have the opportunity to influence the strategy's design, decisions about ownership and organizational forms, etc.

From planning processes that AAU has analyzed and / or participated in, we know:

• That citizen participation must include topics beyond the statutory requirements. An example of the opposite was the planning of the new waste incineration plant in Copenhagen in Amager Ressourcecenter, where the actual waste management was not at all seen as an area for citizen participation, but only the actual physical-aesthetic design of the building!

• That planning across administrative areas within a municipality is necessary - but also a challenge - to create innovative solutions across different administrative fields and their matters of concern e.g. the municipality's objectives for employment and waste minimization.

6. Development of a local vision for circular economy

The above-mentioned local value creation can be achieved through collaboration among companies, housing associations, estate owners' associations, institutions etc. in a municipality or city. In connection with the development of a local vision for circular economy, there is a need for many different forms of innovative cooperation between local actors. The following ideas have been developed as part of AAU's collaboration about circular economy with the integrated urban renewal activities in the Sydhavn neighbourhood near the AAU campus in Copenhagen:

1. Housing and landowners' associations can be the framework for establishing local sharing economy initiatives

2. Non-profit housing associations can be critical and reflective customers and users when purchasing goods for apartments, laundries etc.

3. Public institutions can also be critical and reflective customers and users when purchasing goods and services for local public institutions

4. Local production and service companies can use local users as dialogue partners about user experience: When and why do products have or lose value to the users? How does the actual product use fit with the supplier's expectation of usage practice? How could the product life time be prolonged through re-design of products

5. Strengthening the citizens' local repair possibilities can be done through a combination of easy overview of local commercial repair options, and establishment of repair activities through social economy companies and local repair café etc.

6. The retailer can ask local customers for feedback on user experience and can plan changes in the retail assortment and requirements to suppliers accordingly.

7. The retailer can establish better user support, repair possibilities, product sharing, etc.

8. A waste company can have a dialogue with citizens about why products lose value and are brought to a recycling centre and how this waste can be prevented through the establishment of better user instructions, better and cheaper repair options, etc.

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